Massachusetts Institute of Technology
Department of Economics
Working Paper Series

THE CRISIS: BASIC MECHANISMS, AND APPROPRIATE POLICIES

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Working Paper 09-01
December 29, 2008

Room E52-251
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Cambridge, MA 02142

The Crisis: Basic Mechanisms, and Appropriate Policies*

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December 2008

Abstract

The purpose of this lecture is to look beyond the complex events that characterize the global financial and economic crisis, identify the basic mechanisms, and infer the policies needed to resolve the current crisis, as well as the policies needed to reduce the probability of similar events in the future.

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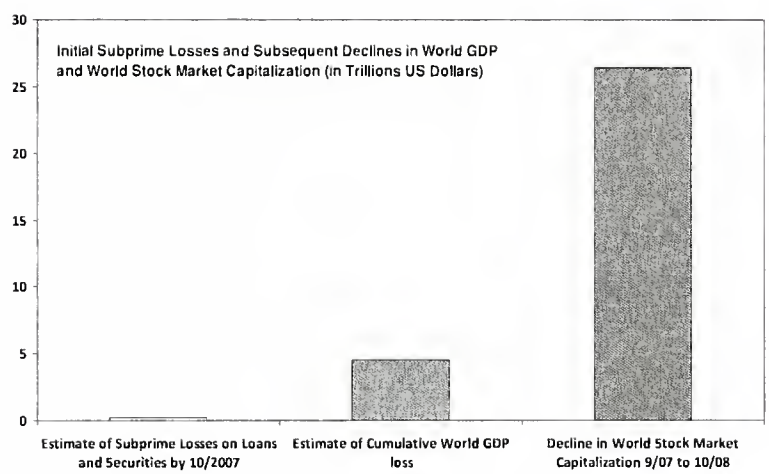
* "Munich lecture", delivered on November 18, 2008. I thank Stijn Claessens, Giovanni Dell'Ariccia, Gianni de Nicolo, Hamid Faruqee, Luc Laeven, Krishna Srinivasan, and many others in the IMF Research Department for discussions and help. I thank Ricardo Caballero, Charles Calomiris, Steve Cecchetti, Francesco Giavazzi, Anil Kashyap, Arvind Krishnamurthy, Andrei Shleifer, and Nancy Zimmerman, for discussions along the way. I thank Ioannis Tokatlidis for research assistance.

† MIT, NBER, and IMF.

It is much too early to give a definitive assessment of the crisis, not least because it is far from over. It is not too early however to look for the basic mechanisms that have taken us where we are today, and to think about the policies we need to implement, now and later. This is what I shall try to do in this lecture. Take it for what it is, a first pass in the midst of the action.[1]

Figure 1



Source: IMF Global Financial Stability Report, World Economic Outlook November update and estimates, World Federation of Exchanges.

The best way of motivating the lecture is to start with the chart in Figure 1. The first bar (which is barely visible) shows the estimated losses on U.S. subprime loans and securities, estimated as of October 2007, at about $250 billion dollars. The second bar shows the expected

1. In the interest of full disclosure: This is a first pass by an economist who, until recently, thought of financial intermediation as an issue of relatively little importance for economic fluctuations...

cumulative loss in world output associated with the crisis, based on current forecasts. This loss is constructed as the sum, over all countries, of the expected cumulative deviation of output from trend in each country, based on IMF estimates and forecasts of output as of November 2008, for the years 2008 to 2015. Based on these forecasts, the cumulative loss is forecast to run at $4,700 billion dollars, so about 20 times the initial subprime loss. The third bar shows the decrease in the value of stock markets, measured as the sum, over all markets, of the decrease in stock market capitalization from July 2007 to November 2008. This loss is equal to about $26,400 billion, so about 100 times the initial subprime loss! The question is an obvious one: How could such a relatively limited and localized event (the subprime loan crisis in the United States) have effects of such magnitude on the world economy?[2]

To answer this question, I shall proceed in four steps.

First, by identifying the essential initial conditions which have shaped the crisis. I see them as fourfold: the underestimation of risk contained in newly issued assets; the opacity of the derived securities on the balance sheets of financial institutions; the connectedness between financial institutions, both within and across countries; and, finally, the high leverage of the financial system as a whole.

Second, by identifying the two amplification mechanisms behind the

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2. Ironically, the other shock which dominated the news until the financial crisis led to the opposite question: How could the very large increase in oil prices from the early 2000s to mid-2008 have such a small apparent impact on economic activity? After all, similar increases are typically blamed for the very deep recessions of the 1970s and early 1980s. The plausible answer, which I shall not explore in this lecture, but is very much worth exploring, must be that the economy has become less fragile in some dimensions, more fragile in others.

crisis, once the trigger had been pulled and some of the assets appeared bad or doubtful. I see two related, but distinct, mechanisms: first, the sale of assets to satisfy liquidity runs by investors; and, second, the sale of assets to reestablish capital ratios. Together with the initial conditions, these mechanisms can lead, and indeed have led, to very large effects of a small trigger on world economic activity.

Third, by showing how the amplification mechanisms have played out in real time, moving from subprime to other assets, from institutions to institutions, and from the United States, first to Europe, and then to emerging countries.

Fourth, by turning to policies. It is too late to change the initial conditions for this crisis... So, current policies should be aimed at limiting the two amplification mechanisms at work at this juncture. Future regulation and policies should also aim however at avoiding a repeat of some of those initial conditions. In short, we need to both fight current fires and reduce the risk of fires in the future.

1 Initial Conditions

The trigger for the crisis was the decline in housing prices for the United States. But, in the years preceding, four evolutions had combined to potentially turn such a price decline into a major world crisis.

1. Assets were created, sold, and bought, which appeared much less risky than they truly were.

Conditional on no housing price decline, most subprime mortgages appeared relatively riskless: The value of the mortgage might be high relative to the price of the house, but it would slowly decline over time as prices increased. In retrospect, the fallacy of the proposition was in its premise: If and when housing prices actually declined, many mortgages would exceed the value of the house, leading to defaults and foreclosures.[3]

Why did the people who took these mortgages, and the institutions which held them, so underestimate the true risk? Many explanations have been given, and many potential culprits have been named. To list some of them: Large saving by Chinese households, leading to a low world interest rate, and thus a "search for yield" by investors disappointed with the return on truly safe assets; large private and public capital inflows into the United States in search of safety, leading suppliers to offer what looked like safe assets to satisfy the demand; too expansionary a monetary policy in the United States, with the implicit promise of low interest rates for a long time; the "originate and distribute" model of mortgage financing, leading to insufficient monitoring by the loan originators. Each of these explanations contains a grain of truth, but only a grain. Why would a low world interest rate necessarily lead to "search for yield"? Why should Alan Greenspan have set a higher US interest rate, if low interest rates reflected low equilibrium world rates, and there was no pressure on inflation? Why should investors have bought mortgages from originators if they knew that monitoring was deficient?

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3. On the relation between property values, mortgages, and foreclosures, read Foote et al [2008]

I suspect that the fundamental explanation is more general. History teaches us that benign economic environments often lead to credit booms, and to the creation of marginal assets and the issuance of marginal loans. Borrowers and lenders look at recent historical distributions of returns, and become more optimistic, indeed too optimistic about future returns.[4] The environment was indeed benign in the 2000s in most of the world, with sustained growth and low interest rates. And, looking in particular at US housing prices, both borrowers and lenders could point to the fact that housing prices had increased every year since 1991, and had done so even during the recession of 2001.[5]

Nor was this understatement of risk confined to subprime loans. Credit default swaps (CDS), which sound complex but are in effect insurance policies, were issued against many risks. For low premia, firms and institutions could insure themselves against specific risks, be it the risk of default by a firm, by a financial institution, or by a country. And CDS issuers were happy to accept these low premia, as they assumed the probability of having to pay out was nearly negligible.

2. Securitization led to complex and hard to value assets on the balance sheets of financial institutions.

Securitization had started much earlier, but changed scale in the last decade. In mid-2008, more than 60% of all U.S. mortgages were securitized. In the mortgage market, mortgages were pooled to form

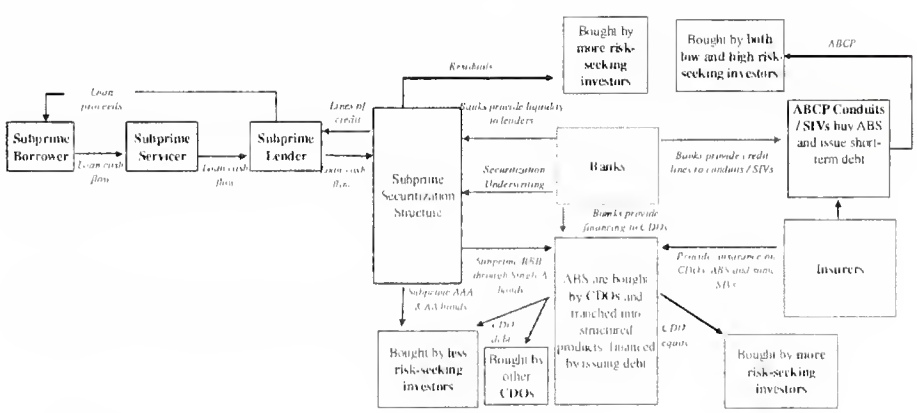
4. For an analysis of credit booms and busts over a large number of countries, see Claessens et al [2008].

5. A point that Charles Calomiris [2008] has called "plausible deniability" (that prices would ever go down).

mortgage-based securities (MBS), and the income streams from these securities were separated ("tranched") further to offer more or less risky flows to investors.

Figure 2, taken from the 2007 IMF Global Financial Stability Report (GFSR) gives a sense of the complexity of that part of the financial system. It shows how initial mortgages were securitized, cut in tranches, and then held by various investors and financial institutions, with different degrees of risk aversion. Going through the various arrows would take the rest of the lecture.[6] My intent is simply to give a visual impression of the complexity of the financing arrangements.

Figure 2. Mortage Finance



Source. Adapted from Figure 1.10: Mortgage Market Flows and Risk Exposures" Chapter 1, p.11, October 2007 GFSR.

6. On this, see Gary Gorton [2007].

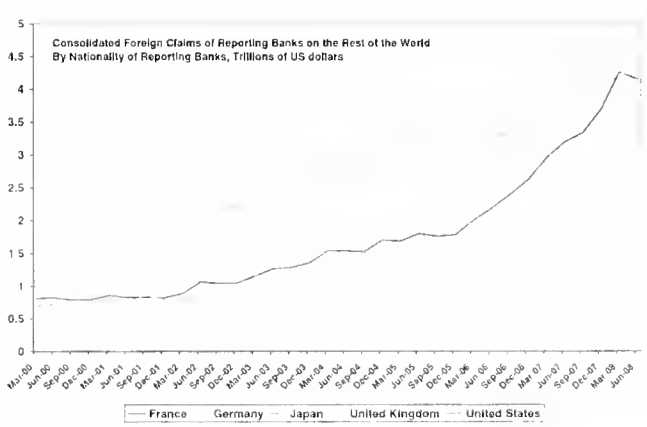
Why did securitization take off in such a way? Because it was, and still is, a major improvement in risk allocation and a fundamentally healthy development. Indeed, looking across countries before the crisis, many (including me) concluded that the U.S. economy would resist a decrease in housing prices better than most economies: The shock would be absorbed by a large set of investors, rather than just by a few financial institutions, and thus be much easier to absorb... This argument ignored two aspects which turned out to be important. The first was that, with complexity, came opacity. While it was possible to assess the value of simple mortgage pools (the MBS), it was harder to assess the value of the derived tranched securities (the CDOs), and even harder to assess the value of the derived securities resulting from tranches of derived securities (the CDO^2s). Thus, worries about the original mortgages translated into large uncertainty about the values of the derived securities. And, in that environment, the fact that the securities were held by a large set of financial institutions implied that this large uncertainty affected a large number of balance sheets in the economy.

3. Securitization and globalization led to increasing connectedness between financial institutions, both within and across countries.

In the same way securitization increased connectedness across financial institutions, globalization increased connectedness of financial institutions across countries. One of the early stories of the crisis was the surprisingly large exposure of some regional German banks to U.S. subprime loans. But the reality goes far beyond this anecdote. Figure 3 shows the steady increase in foreign claims by banks from the

major five advanced countries, an increase from $6.3 trillion in 2000 to $22 trillion by June 2008. In mid-2008, claims by these banks just on emerging market countries exceeded $4 trillion. Think of what this implies if, for any reason, those banks decided to cut on their foreign exposure; unfortunately, this is indeed what we are seeing now (the figure stops in June 2008. Much of the decrease has happened since then.)

Figure 3



(Source: Table 9a, BIS Banking statistics)

4. Leverage increased.

The fourth important initial condition was the increase in leverage. Put another way, financial institutions financed their portfolios with less and less capital, thus increasing the rate of return on that capital.

What were the reasons behind it? Surely, optimism, and the underestimation of risk, was again part of it. Another important factor was a number of holes in regulation. For example, banks were allowed to reduce required capital by moving assets off their balance sheets in so called "structured investment vehicles" (SIVs). In 2006, for example, the value of the off-balance sheet assets of Citigroup, $2.1 trillion, exceeded the value of the assets on the balance sheet, $1.8 trillion. (By mid 2008, writedowns and returns of some of the assets back to the balance sheet had decreased this ratio back to less than one half.) The problem went far beyond banks. For example, at the end of 2006, "monoline insurers" (that is insurers insuring a particular risk, for example default on municipal bonds), operating outside the perimeter of regulation, had capital equal to $34 billion to back insurance claims against more than $3 trillion of assets...

Whatever the reason, the implications of high leverage for the crisis were straightforward. If, for any reason, the value of the assets became lower and/or more uncertain, then the higher the leverage, the higher the probability that capital would be wiped out, the higher the probability that institutions would become insolvent. And this is, again, exactly what we have seen.

2 Amplification mechanisms

Around the end of 2006, US housing price indexes stopped rising and then started declining more steadily. This implied that many marginal mortgages, especially the subprimes extended during the previous expansion, would default. As we saw in Figure 1, the expected loss from

these defaults, as of October 2007, was $250 billion. One might have hoped that this loss would be easily absorbed by financial institutions, with limited financial or economic implications. But, as we know, this has not been the case. The larger crisis is the result of two amplification mechanisms, interacting with the initial conditions I focused on earlier.

1. The first amplification mechanism is the modern version of bank runs.

Let me first go quickly back to basics. Think of financial institutions in the simplest terms, i.e. with assets on the left side of their balance sheet, liabilities on the right side, and capital as the difference between the value of the assets and the value of the liabilities. So long as capital is positive, the institution is solvent; if it is negative, the institution is insolvent. So, when the probability of default on some assets increases, both the expected loss and the uncertainty associated with the asset side of the balance sheet increases. The value of capital becomes both lower and more uncertain, increasing the probability of insolvency. The first amplification mechanism then has two parts:

Depositors and investors are likely to want to take their funds out of the institutions which might become insolvent. In traditional bank runs, say during the Great Depression, it was the depositors that took their money out of the banks. Two changes have taken place since then. First, in most countries, depositors are now largely insured, so they have few incentives to run. And banks and other financial institutions largely finance themselves in money markets, through short term "wholesale funding". Modern runs are no longer literally runs:

What happens is that institutions that are perceived as being at risk can no longer finance themselves on these markets. The result is however the same as in the old bank runs: Faced with a decrease in their ability to borrow, institutions have to sell assets.

To the extent that this is a macroeconomic phenomenon (i.e. to the extent that many institutions and investors are affected at the same time), there may be few deep pocket investors willing to buy assets. If, in addition, the value of the assets is especially difficult for outside investors to assess, the assets are likely to sell at "fire sale prices", i.e. prices below the expected present value of the payments on the asset. This in turn implies that the sale of the assets by one institution further contributes to a decrease in the value of all similar assets, not only on the balance sheet of the institution which is selling, but on the balance sheets of all the institutions which hold these assets. This in turn reduces their capital, forcing them to sell assets, and so on. The amplification mechanism is at work, and you can see how the size of the amplification is determined by initial conditions:

To the extent that the assets are more opaque and thus difficult to value, the increase in uncertainty will be larger, leading to a higher perceived risk of solvency, and thus to a higher probability of runs. For the same reasons, finding outside investors to buy these assets will be more difficult, and the fire sale discount will be larger. To the extent that securitization leads to exposure of a larger set of institutions, more institutions will be at risk of a run. And finally, to the extent that institutions are more leveraged, that is, have less capital relative to assets to start with, the probability of insolvency will increase more, again increasing the probability of runs. As we have seen, all these

factors were very much present at the start of the crisis. This is why this amplification mechanism has been particularly strong.

2. The second amplification mechanism comes from the need by financial institutions to maintain an adequate capital ratio.

Faced with a decrease in the value of their assets, and thus a lower capital, financial institutions need to improve their capital ratio, either to satisfy regulatory requirements, or to satisfy investors that they are taking measures to decrease the risk of insolvency. In principle, they then have a choice. They can either get additional funds from outside investors, additional capital. Or they can "deleverage", that is, decrease the size of their balance sheets, by selling some of their assets or reducing their lending.

In a macroeconomic crisis, finding additional private capital is likely to be difficult. This is for the same reasons as earlier: There may be few deep pocket investors willing to put funds. And to the extent that the assets held by the financial institutions are difficult to value, investors will be reluctant to put their funds in the institutions that hold them. In that case, the only option for these institutions is to sell some of their assets. The same mechanism as before is then at work: The sale of assets leads to fire sale prices, affecting the balance sheets of all the institutions that hold them, leading to further sales and so on. And, for the same reasons as before, opacity, connectedness, and leverage all imply more amplification.

The two mechanisms are distinct. Conceptually, runs can happen even in the absence of any initial decrease in the value of assets. This is

the well-known multiplicity of equilibria: If funding stops, assets must be liquidated at fire sale prices, justifying the stop in funding in the first place. But, clearly, runs are more likely, the higher the doubts about the value of the assets. Conceptually, firms may want to take measures to reestablish their capital ratio even if they have no short-term funding problem and do not face runs. The two mechanisms interact however in many ways. A financial institution subject to a run may, instead of selling assets, cut credit to another financial institution, which may in turn be forced to sell assets. Indeed, one of the channels through which the crisis has moved from advanced countries to emerging market countries has been through cuts in credit lines from financial institutions in advanced economies to their foreign subsidiaries, forcing them in turn to sell assets or cut credit to domestic borrowers.

3 Dynamics in Real Time

The amplification mechanisms are now clear, but this is true only in retrospect. In real time, when housing prices started declining, most economists and policy makers expected the impact to be much more limited. The scope of the amplification mechanisms only became clear over time. Here is the story in real time.

1. Contagion across assets, institutions, and countries.

The widening of the crisis to a steadily growing number of assets, institutions, and countries is shown in Figure 4. The figure is a "heat

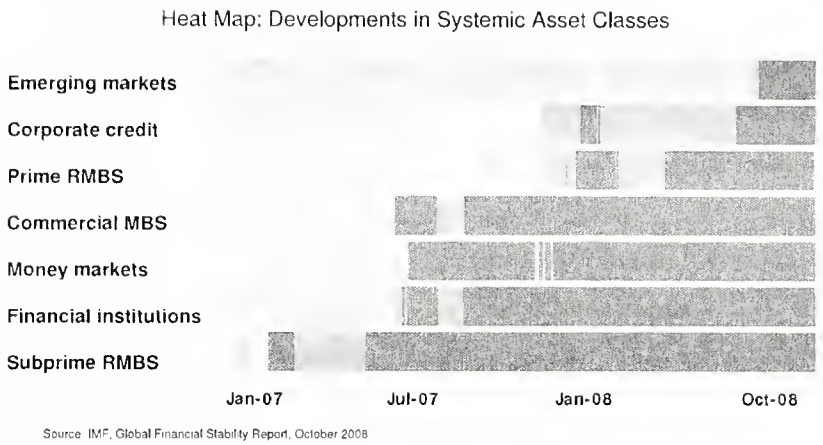
map", constructed by the IMF, which shows the evolution of heat indexes for a number of asset classes. The construction of the index is complex, but the principle is simple: The larger the decrease in the price of the asset, or the higher the volatility of the price, each relative to its average value in the past, the higher the value of the index. As the heat index increases, the color goes from green to yellow to orange and to red (corresponding to 1, 2, 3 and 4 standard deviations respectively, so orange and red should be seen as very rare events).

The figure tells the history of the crisis. Starting from the bottom, see how the crisis started with subprime mortgages in early 2007, extended to financial institutions and money markets (the markets where financial institutions borrow and lend to each other) in the summer of 2007, to regular mortgage pools (Prime RMBS) and corporate credit at the end of 2007, and to emerging market countries in the fall of 2008. At the time of this writing, all classes are in red, showing an exceptional decrease in prices and increase in volatility.

2. Increase in counterparty risk.

Figure 5 shows how the crisis led to an increase in counterparty risk between banks, i.e. to an increase in the perceived probability that a bank borrowing from another bank may not be able to repay. It plots the "Ted spread", which is the difference between the average rate charged by banks to each other for 3-month loans (the "Libor" 3-month rate), and the three-month T-bill rate, the rate at which the government can borrow, for four different countries. Note how the spreads increased from the middle of 2007 on, especially in the United States and the United Kingdom, and how they jumped when the U.S.

Figure 4.

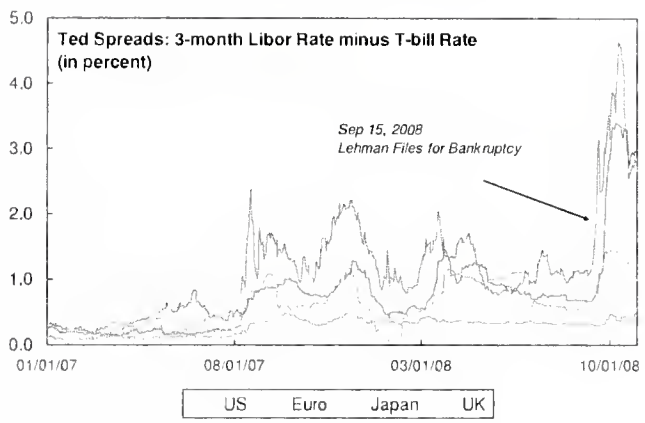


government let Lehman Brothers to file for bankruptcy in September 2008.

Until then, financial markets had assumed that the government would not let large, systemic, banks fail. The failure of Lehman Brothers, and the fact that claims on Lehman became frozen for a long time, convinced them otherwise, leading to a very large jump in the spread. (Note the partial decline at the very end. I shall return to it later.)

Associated with this large increase in perceived counterparty risk, was a sharp decrease in the maturity of the loans that banks were willing to make to each other. The result was the attempt, by each bank, to keep enough cash on hand and limit its reliance on borrowing from other banks.

Figure 5. Counterparty Risk.

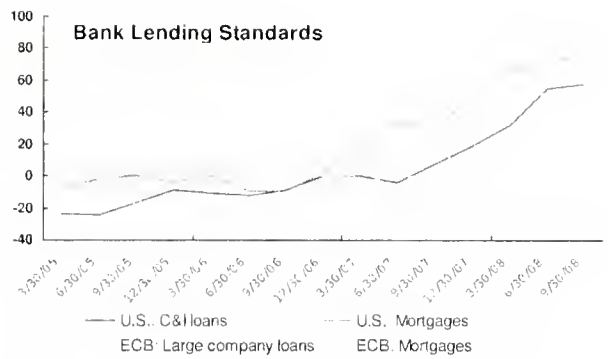


3. Tightening banking standards

One of the ways a financial crisis affects the economy is through credit rationing, i.e. the tightening of lending standards by banks who are deleveraging. This is indeed what has happened.

Figure 6 shows the evolution of an index for changes in bank lending standards in the United States and the Euro Area, for both mortgage loans and for commercial and industrial loans. The index, which is based on a quarterly survey of bank loan officers, reflects the difference between the balance of respondents between those who say they have "tightened considerably-tightened somewhat" and those who say they have "eased somewhat-eased considerably". The figure shows how, since mid 2008, credit has become steadily tighter for firms and households.

Figure 6.

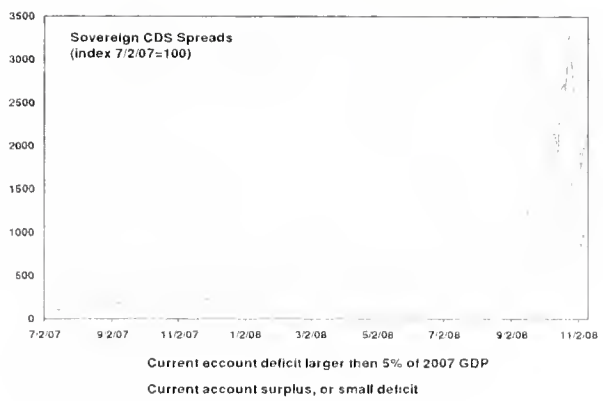


4. Emerging market spreads and sudden stops

Deleveraging has not been limited to domestic credit. For a long time after the start of the financial crisis, it looked as if emerging markets might be shielded from the crisis. The premium most emerging market country governments had to pay relative to the US government (the "sovereign spread") was small, and did not increase much. As Figure 7 shows however, things changed dramatically in the fall of 2008. In the process of deleveraging, advanced country banks started drastically reducing their exposure to emerging markets, closing credit lines and repatriating funds. Other investors did the same. The selling was across the board, but not totally indiscriminate: The figure shows that the premium jumped up substantially more for countries with large current account deficits.

Deleveraging in the form of capital outflows presents additional macroeconomic problems. Not only do countries have to deal with a domestic

Figure 7.



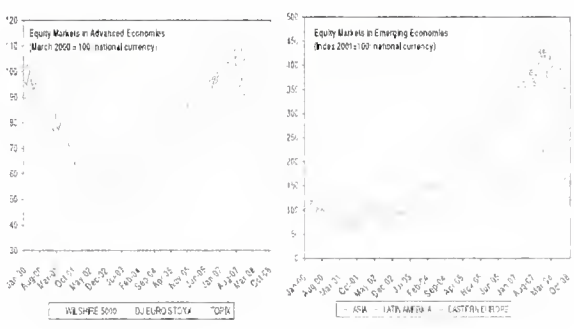
credit problem (as banks experience a run, and the mechanisms we saw earlier are at work), but they have to deal with pressure on the exchange rate. If they have reserves, or if they have access to foreign credit, for example credit from central banks or loans from the IMF, they can use them to limit the depreciation. Otherwise, they may have to accept a large depreciation which, if domestic liabilities are denominated in foreign currency (which they often are) leads to further burdens on debtors, be they households, firms, or financial institutions. The mechanism is familiar from past crises, especially the Asian crisis, and can lead to major economic disruptions. It is playing out in a number of countries today.

5. From the financial crisis to a full-fledged economic crisis

For some time after the start of the financial crisis, the effects of the financial crisis on real activity appeared limited. This however did

not last. Lower housing prices, lower stock prices, triggered initially by the decreased stock market value of financial institutions, higher risk premia, and credit rationing, started taking their toll in the second half of 2007. In the fall of 2008 however, the effect suddenly became much more pronounced. The worry that the financial crisis was becoming worse, and might lead to another Great Depression, led to a dramatic decrease in stock markets, and to a dramatic fall in consumer and firm confidence around the world.

Figure 8a. Stock Prices

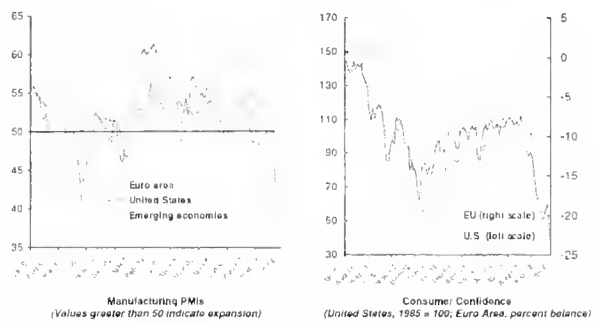


Source: Bloomberg and IMF staff estimates

Figure 8a shows the evolution of stock price indexes from markets both in advanced economies and in emerging market countries: After a long and steady increase from 2002 on, stock prices started declining in the second half of 2007, and then fell abruptly in the fall of 2008. Figure 8b shows the evolution of business confidence and consumer confidence. It shows the dramatic fall in both indexes, for the United States, the euro area, and emerging economies, in the fall of 2008.

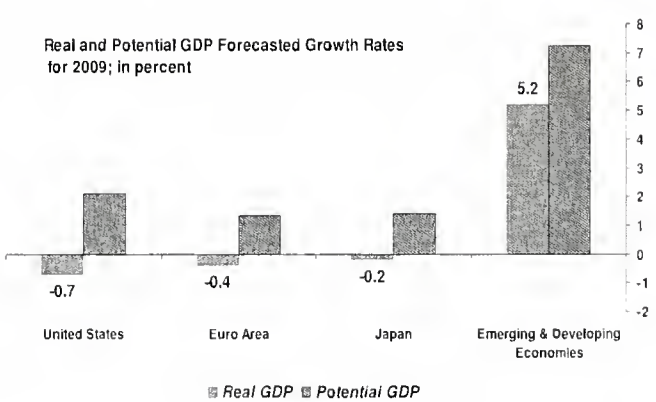
These evolutions have led in turn to a large decrease in demand and in

Figure 8b. Business and Consumer Confidence



output. Figure 9 shows the IMF growth forecasts as of mid-November. Most advanced countries now have negative growth, and the forecasts are for negative growth in 2009 (year on year) as well. Emerging market countries are forecast to have positive growth, but much lower than they have had in the past. The world is clearly now facing a major economic crisis.

Figure 9.



4 Policies for the short run

It is clearly too late to change the initial conditions which led to the crisis... Thus, in thinking about policies for the short run, the purpose must be to dampen the two amplification mechanisms.

1. Dampening the runs. The way to limit runs is conceptually straightforward: It is for the central bank to provide liquidity against good (enough) collateral. If they have access to such funds, financial institutions do not need to sell assets at fire sale prices, and the first amplification mechanism does not operate.

This is exactly what central banks have done, acting as "lenders of last resort" since the beginning of the crisis. Traditionally, such liquidity provision was limited to banks, and the list of assets which could be used as collateral was relatively narrow. What central banks have done during this crisis is to steadily increase both the set of institutions and the list of assets that qualify as collateral. Since mid-2008, the U.S. Federal Reserve, in particular, has pursued a particularly aggressive liquidity policy. As a result, the monetary base has increased from $841 billion in August 2008 to $1,433 trillion in November, an increase of $592 billion in four months...

Has this provision of liquidity been successful? The answer appears largely yes, at least with respect to domestic institutions. However, for countries suffering from capital outflows—largely, but not only emerging market countries—things have been tougher. A few countries have had access to credit in foreign currency from the major central banks, in the form of swap lines. But the others have been exposed. Iceland, which had a very large banking system relative to its economy,

with assets and liabilities largely denominated in euros, became one of the first major casualties of the crisis. Faced with runs (in this case, the inability to borrow in money markets) and not being part of the Euro and thus not having access to the liquidity provided by the European Central Bank, the three major Icelandic banks went bankrupt, creating a deep economic crisis for the country as a whole. Few countries are as exposed as Iceland was. But many are likely to face similar runs, and may need quick access to foreign liquidity.

2. Asset purchases and recapitalization. The provision of liquidity eliminates the first amplification mechanism. It does not however address the second, namely the reestablishment of capital ratios.

Based on the evidence from the resolution of a large number of banking crises in a large number of countries in the past, what needs to be done is fairly well established, and has two components:

First, the state must isolate bad or potentially bad assets. There are various approaches to doing this. One is to leave the assets on the balance sheet of the institutions, but have the state provide a floor to their value, in exchange for example for shares in the institution. Another, which I find more attractive, is for the state to take the assets off the balance sheet altogether, by buying them in exchange for cash, or for safe assets such as government bonds. The central question is that of the price at which to buy them. One can think of two extreme prices: the (pre-intervention) market price, which may well be a fire sale price and thus embody a large liquidity discount; or the estimated expected present value—known as the "hold to maturity" price. The right solution is to set the price between these two extremes, giving, on the one hand, institutions incentives to sell and, on the other hand,

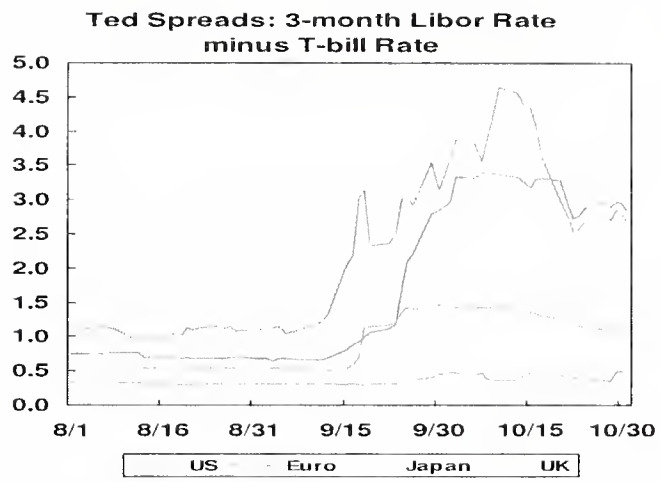
taxpayers a reasonable expectation that, if the assets are indeed held to maturity by the state, they will actually benefit from the purchase in the long run.

The effect of such asset purchases is twofold. First, it sets the value of the assets on the balance sheets, and by reducing uncertainty, allows investors to better assess the risk of insolvency. Second, it increases the price of these assets from their fire sale price to something closer to their underlying expected value, and thus improves the balance sheets of all the institutions which hold these assets, directly or indirectly.

These purchases are however half of what needs to be done. Once the value of the assets is clearer, some institutions may turn out to be insolvent, and thus should be closed. Most are likely to show positive, but too low, capitalization and thus must be recapitalized. This can be done through public funds only or through matching of public and private funds, in exchange for shares. The purpose is to return these institutions to a level of capital so they do not need to further deleverage, to further sell assets or cut credit.

Where are we today on these two fronts? For some time, governments saw the crisis as one of liquidity, thus a problem to be handled by the central banks through liquidity provision. In the fall of 2008, it became clear that undercapitalization was a major issue. In October 2008, the United States introduced the "troubled asset relief program" (TARP), allowing the Treasury to buy assets or inject capital up to $700 billion. A few weeks later, during an important week end in October, with meetings both in Washington and in Paris, major countries agreed to put in place financial programs along the lines sketched above. Since then, France has committed to spend up to 40 billion euros, Germany

Figure 10.



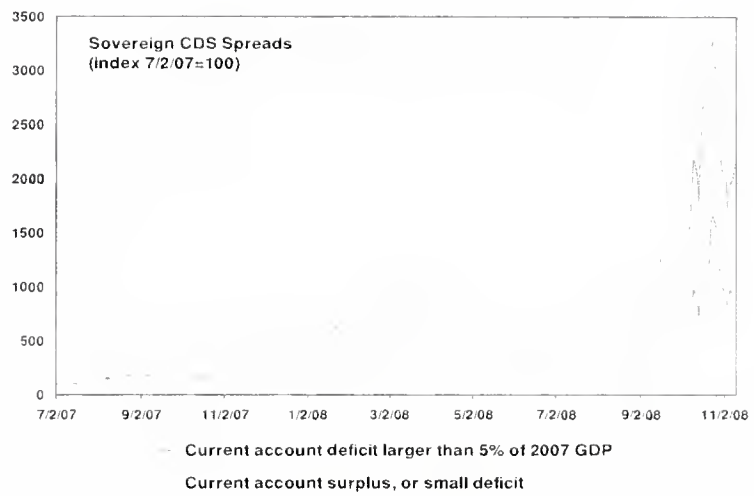
up to 80 billion euros, the United Kingdom, 50 billion pounds. In addition, to alleviate worries about solvency before the programs are fully implemented, most governments have extended the guarantees accorded to depositors to interbank claims, that is claims of banks on other banks.

The size and the complexity of the required programs is enormous, and many governments are still exploring their way. In the United States in particular, the TARP appears to have changed direction twice, with an initial focus on the purchase of troubled assets through auctions, then a shift in focus to recapitalization, and in the more recent past, (for example in the case of Citigroup) a reliance on both providing a floor on the value of some of the assets on the balance sheet, and recapitalization. Other programs appear more consistent, but the funds are being disbursed slowly.

Are these programs working? The verdict is mixed. As Figure 10 shows, the spread between the interbank lending rate and the T-bill rate has decreased, but remains surprisingly high, despite interbank guarantees, and despite recapitalization of some banks. Little has been done to dispose of bad assets, and public capital injections have been limited. Uncertainty about the course and the details of policy has made private investors hesitant to invest funds without knowing the nature of future public interventions. The result is that deleveraging continues, with banks continuing to reduce credit, both domestic and abroad.

Issues of coordination are also at work. The provision of guarantees for some assets can lead investors to move into those assets, making things worse for non-guaranteed assets. We have seen this in the United States for non-guaranteed mortgages. The provision of guarantees by one country can lead investors to move to that country, making things worse for other countries; this was the case for example when Ireland unilaterally offered guarantees to investors in the fall of 2008. Putting capital controls in one country to slowdown capital outflows can lead to the perception that other countries will do the same, therefore triggering capital outflows in those countries. Protecting domestic depositors and investors at the expense of foreign depositors and investors can create the risk of major outflows from depositors and investors in similar situations elsewhere, and the risk of similar measures by other countries. The attempt by Iceland to do just that led the United Kingdom to invoke an anti-terrorist law to get Iceland to change its mind. Finally, guarantees and other measures taken in advanced countries make it more attractive for investors to put their funds in those countries, and thus can lead to further capi-

Figure 11.



tal outflows from emerging market countries. As Figure 11 shows, the sovereign spreads on emerging countries have decreased from their October height, but they remain very high.

I have focused on the measures needed on the financial side. The sharp fall in demand and in output in the past couple of months also requires measures to increase demand. Interest rates on government bonds are already very low, so the scope for using traditional monetary policy is limited. The focus must be now on other policies. On the monetary side, "quantitative easing", that is the purchase of other assets than government bonds by the central bank, can reduce spreads in dysfunctional credit markets. It is clear however that fiscal policy has to play a central role here. At the time of this writing, most countries

are developing fiscal packages, intended at increasing demand directly and decreasing the perceived risk of another "Great Depression". The IMF has argued for a 2% global fiscal expansion, with a commitment to do more if the macroeconomic situation becomes worse than current forecasts. Sustaining world demand is likely to be a central issue in the next few months.

5 Policies to avoid a repeat

Looking forward beyond the crisis (something difficult to do these days), the question arises of how we can avoid a repeat of the same scenario, how we can decrease the fragility of the financial system, without impeding too much its efficiency.

Much work is already going on, both in international institutions and in academic departments, ranging from the examination of rules governing ratings agencies, to constraints on executive compensation, to rules for valuing assets on balance sheets, to the construction of regulatory capital ratios, and so on. I have neither the expertise, nor the time here, to go into details. But I can try to give you a sense of the broad directions.

Recall the basic argument of this lecture, that the scope of the crisis is due to the interaction between initial conditions and amplification mechanisms. We have already discussed how liquidity provision and state intervention can dampen the amplification mechanisms. The remaining question, in our context, becomes: Should we try to avoid recreating some of the initial conditions which led to the crisis?

Some of these initial conditions are clearly here to stay. Securitization, and, by implication, relatively complex derivative securities, allow for a much better allocation of risk. The challenge is to prevent complexity from turning into opacity; we can probably do much better than we have in the past. Or, to take another initial condition, cross border activities and large cross border positions are also essential to competition and the allocation of funds and risk in the world. They should not and will not go away.

Where something can and probably should be done is in decreasing leverage. Leverage of the financial system as a whole was almost surely too high before the crisis. Regulation can force lower leverage. This requires however increasing the perimeter of regulation beyond banks to many other financial institutions. The challenge here is how and where to draw the perimeter, whether, for example, to put hedge funds in or out, and, if they are in, what rules to put them under. One must also go beyond leverage within the financial system, and look at leverage for the economy as a whole: Highly levered firms or households are also highly exposed to small fluctuations in the value of their assets. The irony is that many existing tax rules favor such leverage, from the tax deductability of mortgage interest payments by households, to the tax deductability of interest payments by firms. We have to revisit these rules.

Even if and when new regulation is introduced and tax laws are changed, we should be under no illusion that systemic risk will be fully under control. Regulation will be imperfect at best, and always lag behind financial innovation. There will still benign times, and they will lead to underestimation of risk (the first of the initial conditions I

listed at the beginning of the lecture). Thus, a major task of regulators will be to monitor, and, if needed, to react to increases in systemic risk. In doing so, they will face two sets of challenges:

The first is about monitoring itself, what information to collect, and how to use it to construct measures of systemic risk, both at the national and international level. Some of the information needed is just not available today. We do not know, for example, the distribution of CDS positions among investors and countries. This is one of the reasons why many advocate moving trading from over the counter to a centralized exchange; this would allow, in particular, for better collection of information. And, even if the information becomes available, how to construct measures of systemic risk is a difficult conceptual exercise. We are surely not there yet.

The second challenge is how to react when measures of systemic risk increase. Pro-cyclical capital ratios, in which capital ratios increase either in response to activity or to some index of systemic risk, sound like an attractive automatic stabilizer. They can dampen the build up of risk on the way up, and the amplification mechanisms on the way down. The challenge is clearly in the details of the design, the choice of an index, the degree of procyclicality. Another avenue is to use monetary policy more actively. The idea that monetary policy should be used to fight asset price or credit booms is an old and controversial idea. Before the crisis, some consensus had developed that monetary policy was a very pool tool to fight asset price booms, and it should care only about asset prices to the extent that such prices had effects on current or prospective inflation. The crisis has certainly reopened the debate.

6 Conclusions

Let me end where I started. This lecture is written in the middle of the crisis. And, as I write it, the crisis appears to be entering yet a new phase, in which a drop in confidence is leading to a drop in demand, and a major recession. This in turn raises a set of new issues, from the dangers arising from the interaction between a deep recession and a weakened financial system, to the risk of deflation and liquidity traps, to further capital outflows from emerging countries and sudden stops, to an increased risk of trade wars, to the effects of the collapse of commodity prices on low-income countries. I am afraid you will have to invite me again next year for an update...

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(I have made no attempt to give a complete literature review, either in the lecture or in this bibliography. Some of the recent articles listed below trace the ideas to the earlier literature.)

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